Summary for Intellectual Capital and Knowledge Systems

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May 1, 2011

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1.1 Questions

- Becker
  - What is human capital, what kinds of human capital are discussed
    - training, education, health, morale, etc.
  - What is the basic model (NPV etc., see below)
  - Go through the stylized facts & find the answers given by Becker (see below)
- Ben-Porath
  - Does the model portray a realistic view of the labour market?
    Challenge of discerning between time spent educating and working. Possibility of doing both at same time. Possibility of being paid for work experience not educational, unpaid study time.
  - How does this model, if significant and supported by evidence, help policy makers?
    Difficulty of measuring s_t. Rate of interest r, the rental price of human capital a_0 and price of purchased inputs P_d can be influenced.
  - In which case could δ (the rate of deterioration) be negative?
- Lazear
  - How does the skill-weights view alleviate some of the problems of classical firm-specific human capital?
    Firm-specific human capital seems difficult to prove, since most knowledge is at least somewhat universal. An approach based on the relative knowledge of general skills is more applicable/realistic.
  - (page 17) What are possible drawbacks of this approach?
    Jobs may not pay for skills beyond a certain point (overqualification) or may exhibit diminishing returns on skills. Does not take into account not getting a job at all because of lower bound on skills. Relative skill requirements mean it could be a optimal strategy to train one skill more than would be required in absolute terms since the other skill was trained too much in relative terms.

1.2 (Becker, 1962) "Investment in Human Capital: A Theoretical Analysis"

1.2.1 Stylized Facts

1. Earnings typically increase with age at a decreasing rate. Both the rate of increase and the rate of retardation tend to be positively related the level of skill.

   UU is the untrained person, TT trained person (first paying for, then collecting rent from training). Difference between UU and TT greater the greater the cost of

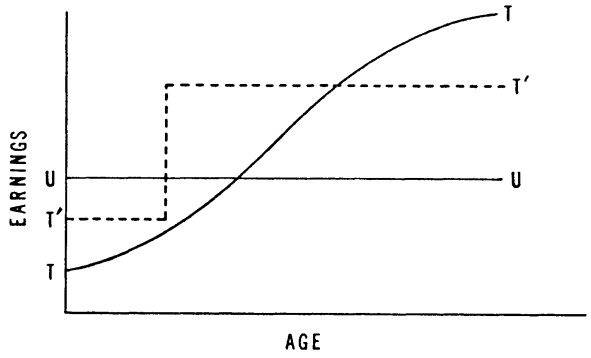

Figure 1: from Becker, p.15

and return from training. Not only does training make the curve steeper, but also more concave. Extreme case TT'.

2. Unemployment rates tend to be negatively related to the level of skill
    - market demand, MP...
3. Firms in underdeveloped countries appear to be more "paternalistic" toward employees than those in developed countries
    - investment in activities outside the job are done when an increase in productivity is the result
    - e.g. health, anti-alcoholism
    - thus, this "paternalistic" behavior results from typical behavior outside the firm!
4. Younger persons change jobs more frequently and receive more on-the-job training than older persons
    - decisions regarding human capital are NPV decisions
    - therefore, they are driven by the time-frame of the decision (on-the-job training)
5. The distribution of earnings is positively skewed, especially among professional and other skilled workers
6. Abler persons receive more education and other kinds of training than others
    - higher MP...
7. The division of labour is limited by the extent of the market
    - a larger market generates *incentives* for more specialization, as higher investments in education are rewarded by higher wages
    - thus, a "larger market" implies more demand for specialized skills...
8. the typical investor in human capital is more impetuous and thus more likely to err than is the typical investor in tangible capital

1.2.2 Basic Model

$$MP = w \tag{1}$$

Workers have different unique productivities (wages) in each period.

$$MP_t = w_t \tag{2}$$

Training lowers current receipts (R) and raises current expenditures (E). However this trend is reversed for future periods. Therefore: NPV consideration.

$$\sum_{t=0}^{n-1} \frac{R_t}{(1+i)^{t+1}} = \sum_{t=0}^{n-1} \frac{E_t}{(1+i)^{t+1}} \tag{3}$$

Now we only have training in the first period; Expenditures in first period are wages + cost of training (k); afterwards only wage. Receipts in all periods is MP.

$$MP_0 + \sum_{t=0}^{n-1} \frac{MP_t}{(1+i)^t} = W_0 + k + \sum_{t=0}^{n-1} \frac{W_t}{(1+i)^t} \tag{4}$$

We define term G

$$G = \sum_{t=1}^{n-1} \frac{MP_t - W_t}{(1+i)^t} \tag{5}$$

Now equation (4) becomes

$$MP_0 + G = W_0 + k \tag{6}$$

Now we need to include the fact that training takes away time from production. (MP_0' what could have been produced, $MP_=$ what was actually produced, C is the sum of opportunity cost and the outlays on training) Equation (6) becomes

$$MP_0' + G = W_0 + C \tag{7}$$

We see that G is the excess of future receipts over future outlays (a notion of return on training). Optimality condition: $G = C$ (return equals cost)

1.2.3 General Training

General Training: This kind of training generally increases the MP of the worker. Since the worker can switch jobs, he will have to bear the costs of this kind of training.

Hence, MP and W are raised by the same amount! $MP_t = W_t \forall t$

$$G = \sum_{t=1}^{n-1} \frac{MP_t - W_t}{(1+i)^t} = 0 \tag{8}$$

Thus, eq. (7) becomes

$$MP_0' = W_0 + C \tag{9}$$

$$\rightarrow W_0 = MP_0' - C \tag{10}$$

1.2.4 Specific Training

Specific Training: This kind of training only increases the MP of the worker for the specific firm. Consequently, in this extreme case firms are willing to pay for the training, since the investment is offset by increases in profit due to higher MP of the workers. On the other hand, workers will not be willing to invest, since they have "no gain" from this kind of investment. The gain is fully absorbed by the firm!

1.3 (Ben-Porath, 1967) "The Production of Human Capital and the Life Cycle of Earnings"

1.3.1 Fact sheet

1. People make most of their investments in themselves when they are young, and to a large extend by foregoing current earnings.

2. The larger the stock of human capital, the larger the earnings per unit of time that the individual could get in the market and therefore the higher the foregone earnings from diverting a unit of time away from the market.

3. If $\gamma_1 = \gamma_2$ (Cobb-Douglas: Equation (17), p. 360) the more highly educated person is also better equipped for learning, so that his higher opportunity cost is matched by the greater amount of skills that he can acquire per hour.

4. If $\gamma_2 > \gamma_1$ capital accumulation reduces the cost of producing human capital, and it is possible even in phase (ii) to have a stretch of time over which investment rises.

5. Three phases will exist:

   - Available stock of human capital K_t is not large enough to satisfy demand.
   - Available stock is enough to supply the services demanded, so that $0 < s < 1$ and the services of human capital are truly a variable factor.
   - Stock of capital is too big so that the optimal policy requires more disinvestment than is feasible through deterioration, that is to produce negative quantities of human capital.

6. *Normal case*: Capital stock does rise over a period, eventually as gross additions become very small and the stock becomes large this must be reversed, and toward end of life, T, the stock will decline, if there is any deterioration.

7. $\dot{I}$ is always negative. Thus the curve of observed earnings exaggerates the rate of increase of earning capacity when the latter increases and understates its decline when it declines.

8. If depreciation is zero, there is always, except at point T, an increase in the three types of earnings (E_t - disposable earnings, Y_t - earning capacity, $\hat{E}$ - observed earnings), and at each point in time their rank by rate of change will be the reverse of their rank by level.

9. If there is no deterioration ($\delta = 0$) the ever rising curve of observed earnings is always concave from below.

10. Possibility that optimal decision requires initial assignment of $s = 1$, or 100% of the labour force educating themselves.

1.4 (Lazear, 2003) "Firm-Specific Human Capital: A Skill-Weights Approach"

1.4.1 Fact sheet

1. The "skill-weights" view allows skills to be general instead of firm-specific. Instead the relative importance of skills makes them more or less attractive to employers.

2. $y_i = \lambda_i A + (1 - \lambda_i)B$ is the potential earning for a worker with skill set (A, B) at firm i.

3. λ_i reflects that firm i may weigh the two skills differently.

4. p is the probability that the worker is going to stay with the current company in the next period.

5. The difference between the earnings growth associated with a given amount of experience for those who stay and those who go leads on the *tenure coefficient*. The amount of wage growth the leavers get loads on the experience coefficient.

6. The worker must chose his investment strategy not knowing whether he will leave the firm or not. p is usually large enough so that he caters to the needs of the first job. When he looses his job he will also loose some income since his skill set will most likely be poorly matched to the new job.

7. The lower p, the less he looses through being let off.

8. The tenure coefficient should be negatively related to the amount of turnover in the occupation.

9. Those who leave a firm with unusual weighting patterns suffer larger wage loss for a given p.

10. $Marketthickness$ is modeled as allowing more search: Two draws occur, for the second of which the worker can decide whether to switch jobs or not.

11. In thicker markets a worker looses less on a move despite a more idiosyncratic investment strategy.

12. Investment increases over time because except for a perfect match between the preferences of the first and second company another round of investment is appropriate.

13. Shown with data: It is possible to generate tenure coefficients that are nearly the same size as the experience coefficients (90%).

14. The higher p, the large the tenure coefficient.

15. When λ takes extreme values it tends to be far away from $\bar{\lambda}$, which is why the uniform distribution yields lower tenure coefficients than the bimodal.

2 Meeting 4

2.1 (Destré et al., 2006) "Learning form experience or learning from others?"

2.1.1 Introduction

- Mincerian earnings function: Linear in education, quadratic in labor market experience.
- extended version: includes a quadratic funtion of tenure in the incumbent firm

Here, the authors have a dataset based in France, of 150,000 wage earners and 16,000 establishments. They furthermore distinguish informal training by means of learning from own experience and learning from others.

2.1.2 Informal learning on-the-job from self and others: theory

- workers acquire job-specific training, either formally or informally. Both forms are costly, but the difference is that purely informal learning does not take time away from others.
- informal training often depends on the work contract. workers are "forced" to acquire the knowledge of the firm. Thus, workers bear the cost of training, but also reap the rewards.

Formally, for worker i in firm and job j and time period t: Job-specific human capital h_{ijt}. H_{ijt} is the human capital level of the "teacher" for informal learning. Factor g is the depreciation rate of human capital (normally positive). n is the rate of knowledge diffusion in the firm.

$$h_{ijt} - h_{ij,t-1} = g h_{ij,t-1} + \frac{n}{1+n}(H_{ij,t-1} - h_{ij,t-1}), \forall t \geq 1 \quad (1)$$

Furthermore, it is shown how job-specific human capital grows with "tenure" (time on the job).

$$h_{ijt} = (1+g)^t h_{ij0}(1 + (k^t)\lambda_{ij}), \text{ with } \lambda_{ij} = \frac{H_{ij0}}{h_{ij0}} - 1 \forall \lambda ij \geq 0 \quad (3)$$

λ_{ij} denotes the job-specific learning from others' potential, it is independent of tenure. Now, the equation is converted in natural logarithms (for econometric estimation)

$$\log h_{iht} = \log h_{ij0} + gt + \log(1 + \lambda_{ij}(1 - k^t)) \quad (4)$$

λ can probably be approximated:

$$\log h_{iht} = \log h_{ij0} + gt + \lambda_{ij}(1 - k^t) \text{ with } \lambda_{ij} = \log \frac{H_{ij0}}{h_{ij0}} \quad (5)$$

Now, the logarithm of gross earnings is the sum of a linear-in-tenure experience effect and an exponential effect of learning from others that converges fast towards the firm's job-specific learning potential.

2.1.3 The returns to tenure

The marginal returns to tenure (R) are defined as:

$$R_{ijt} = \frac{h_{ijt} - h_{ij,t-1}}{h_{ij,t-1}} \; \forall t \geq 1$$

"after a few manipulations"

$$R_{ijt} = g + \frac{n}{n+1}\left(\frac{\lambda_{ij}k^{t-1}}{1 + \lambda_{ij}(1 - k^{t-1})}\right) \quad (6)$$

2.2 (Ertaut, 2000) "Non-formal learning and tacit knowledge in professional work"